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EXAMINER	
GRAHAM, ANDREW R	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/453,525	Applicant(s) HASEGAWA ET AL.	
	Examiner Andrew Graham	Art Unit 2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 7-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-5 and 7-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *15*.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. **Claim 5** is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 5 includes the limitation of "activation/deactivation means". Claim 1 includes the limitation of "switches connected between output terminals of the power amplifiers and the speaker". These components correspond to parts (18,19) of Figure 4 and parts (15) of Figure 1, respectively. However, these parts are not disclosed as being incorporated into the same embodiment of the apparatus, as is suggested by the current version of the claims. The teachings of the specification of the present application further suggest that both such parts in the same apparatus would redundantly perform that same function. Regardless, the combination of the two parts in a single apparatus is not disclosed in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed apparatus.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation of "muting means". Claim 1, from which Claim 2 depends, also recites a "muting means". However, the citation of the "muting means" in the Claim 2 does not clearly convey that this means is intended to be the same means as is cited in Claim 1 or a second, separate muting means. Appropriate correction or clarification is required.

Claim 21 recites the limitation "the activation/deactivation circuit" in the sixth line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 9, 11, 13, and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoki (USPN 4752744).

Regarding **Claim 9**, Aoki discloses balanced transformerless (BTL) circuit that maintains the DC offset voltage at an acceptable, predetermined value. The structure of one embodiment of the system is shown in Figure 2. As can be seen, the embodiment comprises the components of a signal input (23), a preamplifier (11), a set of balanced amplifiers (12,13), a load or loudspeaker (30), and a difference amplifier (14) (col. 4, lines 30-38 col. 5, lines 1-14). The two amplifiers (12,13) are non-inverting are a part of a balanced transformerless circuit (10) that outputs a differential signal to the load (30) (col. 5, lines 1-34). These amplifiers (12,13) read on "a first amplifier which at least indirectly receives an input signal" and "a second amplifier which at least indirectly receives the input signal". The signals that are applied to the load (30) over the pair of output terminals (28,29) are also applied to the inverting and non-intverting terminals of a difference amplifier (14) (col. 5, lines 35-41). The output of the difference amplifier (14) is a signal that

represents the DC offset present in the output signal that is applied across the load (30) (col. 5, lines 45-47). The output of the amplifier (14) is connected to a transistor (16), which is part of the preamplifier (11)(col. 5, lines 47-51). In operation, the two potentials of the emitter terminals (15e,16e) have a specific voltage that defines a center, acceptable value of DC offset (col. 7, lines 37-68; col. 8, lines 1-66). The set of terminals detect and compensate for both positive and negative voltage offsets in order to maintain this standard potential (col. 8, lines 56-66). The combination of the difference amplifier (14) and the transistors (15,16) of the preamplifier (11) reads on "a control circuit". The amplifier (14) and its output read on "the control circuit detects the differential voltage between a first output signal output from the first amplifier and the second output signal output from the second amplifier to provide a DC offset". The concept of a center, standard voltage and the response to a detected offset voltage that is above or below this standard voltage reads on "wherein the control circuit determines whether or not the DC offset is larger than a prescribed voltage".

Regarding **Claim 11**, each of the amplifiers (12,13) inputs the signal applied from the reception terminal (23) through a pair of transistors (15,16) (col. 4, lines 59-66; col. 5, lines 1-9). These connections for one of the amplifiers (12) read on "the first amplifier at least indirectly amplifies the input signal to generate the first output signal".

Regarding **Claim 13**, each of the amplifiers (12,13) inputs the signal applied from the reception terminal (23) through a pair of transistors (15,16) (col. 4, lines 59-66; col. 5, lines 1-9). These connections for the other amplifier (13) read on "the second amplifier at least indirectly amplifies the input signal to generate the second output signal".

Regarding **Claim 16**, the difference amplifier (14) of Aoki outputs the DC offset of the pair of signals applied to the load (30) of the system (col. 5, lines 45-47). This reads on "the control circuit performs at least one of detecting the differential voltage to provide the DC offset".

Regarding **Claim 17**, the preamplifier (11) output of Aoki is automatically adjusted by directly connected signaling means as is discussed in further detail in the rejection of Claim 15 (col. 8, lines 19-66). This setting of the preamplifier output potential through the use of transistors and a feedback signal reads on "the input signal is provided by an electronic volume".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki as applied above, and in further view of Kalb et al (USPN 5939938), GrosJean (3959735), and Trump (USPN 4301330).

Aoki discloses balanced transformerless (BTL) circuit that maintains the DC offset voltage at an acceptable, predetermined level. The structure of one embodiment of the system is shown in Figure 2. As can be seen, the embodiment comprises the components of a signal input (23), a preamplifier (11), a set of balanced amplifiers (12,13), and a load or loudspeaker (30), and a difference amplifier (14) (col. 4, lines 30-38 col. 5, lines 1-14). The two amplifiers (12,13) are non-inverting are a part of a balanced transformerless circuit (10) that outputs a differential signal to the load (30) (col. 5, lines 1-34). In view of these amplifiers, the system shown in Figure 2 reads on "A BTL apparatus having two power amplifiers in a BTL configuration for driving a speaker". The signals that are applied to the load (30) over the pair of output terminals (28,29) are also applied to the inverting and non-inverting terminals of a difference amplifier (14) (col. 5, lines 35-41). The output of the difference amplifier (14) is a signal that represents the DC offset present in the output signal that is applied across the load (30) (col. 5, lines 45-47). This circuit and its output read on "detection means for detecting a differential voltage to provide a DC offset between outputs from the two power amplifiers". The output of the amplifier (14) is connected to a transistor (16), which is part of the

preamplifier (11)(col. 5, lines 47-51). In operation, the two potentials of the emitter terminals (Ve15,Ve16) have a specific voltage that defines a center, acceptable value of DC offset (col. 7, lines 37-68; col. 8, lines 1-66). The set of terminals detect and compensate for both positive and negative voltage in order to maintain this standard potential (col. 8, lines 56-66). The response of a these transistors to an offset voltage above or below this predetermined potential reads on "decision means for deciding whether or not said differential voltage is larger than a prescribed voltage".

However, Aoki does not specify certain components and operating conditions of the circuit, including:

- muting means for muting an input signal to be supplied to the power amplifiers during a predetermined length of time

Kalb discloses a signal suppression circuit for eliminating transient output noises that appear on an speaker input line during the "power up" and "power down" stages of an audio amplifier. The amplifier circuit includes two speaker amplifiers (102,104), which provide the speaker with a differential input signal (col. 4, lines 19-28). During a "power up" transient, these amplifiers (102,104) receive and emit a controlled voltage from a designated voltage generator (108) (col. 5, lines 22-24). A bypass switch (122) is closed during the initial part of this transient, which effectively prevents the amplifiers (102,104) from outputting the input signal voltage (col. 5, lines 18-22). A comparator (130) holds this switch (122) in its closed, bypassing stage until the voltage generator (108)

outputs a voltage that the comparator (130) determines to be higher than a reference voltage (133), at which point the input signal is not longer bypassed (col. 5, lines 34-45). Kalb discloses the making of resistors variable and the related possibility of giving the amplifiers a controllable gain (col. 9, lines 46-64). As detailed above, the switching circuit (122) provides a bypass which, in combination with reference voltage (141), prevents the input signal from being amplified by the first amplifier (102). The switching circuit and the corresponding substitution of the input signal during a controlled increase of a reference signal read on "muting means for muting the input signal to be supplied from said volume to the power amplifiers during a predetermined length of time".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include the transient stage muting means of Kalb as part of the input circuitry of Aoki. The motivation behind such a modification would have been that such muting would have prevented sudden transient noises from being emitted from the speakers before the preamplifier of Aoki is able to determine and implement a feedback signal and otherwise control the amplitude of a processed signal.

However, the system of Aoki in view of Kalb does not specify:

- that the muting means supplies no input signal to the power amplifier means while the DC offset is detected

GrosJean discloses a system for detecting and protecting a loudspeaker output from receiving an undesirable positive or negative

DC potential. Figure 2 illustrates one embodiment of the system wherein positive or negative DC potentials are applied through either of a pair of diodes (35,27) to bias a transistor (23) (col. 3, lines 9-22). The switching means (7) of the system comprises a movable contact arm (19) and is used in the presence of a positive or negative potential to disconnect the power source from the power amplifiers (9,11) (col. 3, lines 13-16). The disconnected state of the switches (19) is maintained by a latch means, the duration of which is determined by the properties of the involved resistances and capacitances (col. 3, lines 23-35). The switches also read on "muting means". This maintaining of a switch state, in view of the complete disconnection of the power source from the amplifiers, reads on detecting "while no input signal is supplied to the power amplifiers by the muting means".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to employ the complete input disconnection as taught by GrosJean in place of the ramping voltage or before the ramping voltage taught as part of the transient stage of the system of Aoki in view of Kalb. The motivation behind such a modification would have been that such a complete disconnection of input signal sources would have prevented an amplifier with transistor failure from applying an undesirable direct current to the speakers. Such a protection scheme would have also been inexpensive as compared to other solutions such as fuses or circuit breakers, and such an arrangement would have also not required the replacement parts of

these systems.

However, Aoki in view of Kalb and GrosJean does not specify:

- switches connected between output terminals of the power amplifiers and the speaker
- that the switches are turned off when it is decided the differential voltage is larger than the prescribed voltage, preventing the speaker from being supplied with the output signals from the power amplifiers

Trump discloses a loudspeaker protection circuit for sensing a DC signal at an unacceptable voltage being applied to a loudspeaker. The presence of a DC signal of undesirable levels is determined based on the successive lengths of time that a signal exceeds a given voltage range (col. 3, lines 4-20). The detection of a signal that exceeds the given voltage is compared with the length of time that the signal previously exceeded the given voltage range (col. 2, lines 35-49). Non-matching excursions beyond the given range indicate the presence of a potentially damaging condition (col. 2, lines 58-62). The detection of a damaging condition or undesirable amount of DC current triggers a switch (250) connected in series between the amplifier output and the loudspaker to be disconnected (col. 3, lines 20-24). This switch, in the context of a balanced transformerless arrangement that applies two audio signals to a speaker, reads on "switches connected between output terminals of the power amplifiers and the speaker". The concept of the switches being altered based on the exceeding of a given amount of DC voltage reads on "whereby the

switches are turned off when it is decided that the differential voltage is larger than the prescribed voltage, for preventing the speaker from being supplied with the output signals from the power amplifiers".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to utilize the switching circuits and corresponding control circuitry of Trump to handle the detected DC offset ranges in the system of Aoki in view of Kalb and GrosJean. The motivation behind such a modification would have been that such an arrangement would have completely removed the potentially damaging voltage from the speaker input. The system of Aoki responds to a undesirable potential by providing feedback that, as the DC offset increases or a large offset quickly appears, provides a larger feedback signal as compensation, whereas the system of Trump would have removed the excessive voltage from the speaker inputs while the offset returns to acceptable levels.

Regarding **Claim 2**, Kalb discloses the making of resistors variable and the related possibility of giving the amplifiers a controllable gain (col. 9, lines 46-64). Such a modification would have involved making the resistor (120) that provides the feedback across the first amplifier (116) variable. This would have altered the signal level provided to the speakers and reads on "volume means". Aoki discloses the use of a preamplifier (11) that, through the use of a DC offset input signal (V_{OS}) and a selected combination of component values, provides an alteration of the potentials applied through the

emitters of the transistors (Ve15,Ve16), which alters the signal levels applied through the amplifiers (12,13) to the output terminals (28,29) (col. 8, lines 19-55). This preamplifier (18), which changes the center potential of the processed signal, maintaining it near half of the power source voltage, reads on "volume means for adjusting a signal level of said input signal level of said input signal to the amplifiers". As detailed above, the switching circuit (122) of Kalb provides a bypass which, in combination with reference voltage (141), prevents the input signal from being amplified by the first amplifier (102) during the time period of which comparisons are made by the voltage comparator (130) of the system of Kalb. Also in the system of Aoki, the comparison that controls the state of the loudspeaker protection circuit is based on the production of a DC offset signal by an included difference amplifier (14) (col. 5, lines 35-50). Changes to the mute condition in the system of GrosJean also require the determination of the detected DC offset. Accordingly, the comparisons made in the system of Kalb which control the state of the overall system, in view of the values of comparison in the system of Aoki and GrosJean reads on "muting means for muting the input signal to be supplied from said volume to the power amplifiers during a predetermined length of time required to provide the DC offset by stopping the input amplifiers".

Regarding **Claim 3**, the system of Kalb specifically operates during the "power on" and "power off" transient periods of the audio amplifier system, which reads on "detection means and decision means

are operated when a power switch is turned on or a signal source is selected" (col. 4, lines 60-67 and col. 5, lines 1-18).

Regarding **Claim 4**, the system of Trump discloses the use of logic states for establishing the operation of the system as it particularly relates to the output voltage of the system (col. 6, lines 1-27). This logic-based control of signal, in the context discussed above in regards to Claim 2, reads on "said volume means is an electronic volume". It is further noted that the preamplifier (11) output in the system of Aoki is automatically adjusted by directly connected signaling means, which also reads on "an electronic volume".

Regarding **Claim 5**, Trump discloses the option of disabling (260) the amplifier of an audio circuit in the presence of a detected undesirable signal (col. 3, lines 34-45). This option, in view of the pair amplifiers in a BTL arrangement reads on "activation/deactivation means for activating/deactivating the power amplifiers, which deactivates said power amplifiers when it is decided that the DC offset is larger than said prescribed voltage by the decision means".

Regarding **Claim 7**, Trump teaches that the use of a delay of sufficient length will provide audible indication as to the undesirable signal situation (col. 3, lines 30-33). The inclusion and use of such a delay means reads on "warning means for giving a warning when it is decided that said DC offset is larger than prescribed voltage by said decision means".

Regarding **Claim 8**, please refer to the above rejections of the similar limitations of Claims 1, 2, and 5, noting that switch (260) of Trump is disclosed as being reconnected (col. 3, lines 39-45).

5. Claims 10, 12, and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki as applied above to Claim 9, and in further view of GrosJean.

As detailed above, Aoki discloses balanced transformerless (BTL) circuit that maintains the DC offset voltage at an acceptable, predetermined level.

The system of Aoki does not specify:

- that the muting means supplies no input signal to the power amplifier means while the DC offset is detected

Grosjean discloses a system for detecting and protecting a loudspeaker output from receiving an undesirable positive or negative DC potential. Figure 2 illustrates one embodiment of the system wherein positive or negative DC potentials are applied through either of a pair of diodes (35,27) to bias a transistor (23) (col. 3, lines 9-22). A switching means (7) comprises a movable contact arm (19) and is used in the presence of a positive or negative potential to disconnect the power source from the power amplifiers (9,11) (col. 3, lines 13-16). The disconnected state of the switches (19) is maintained by a latch means, the duration of which is determined by the properties of the involved resistances and capacitances (col. 3, lines 23-35). This maintaining of a switch state that corresponds to

the existence of a DC potential, in view of the complete disconnection of the power source from the amplifiers, reads on detecting "the control circuit detects the DC offset when the input signal is muted and no input signal is supplied to the amplifiers".

Regarding **Claim 12**, please refer above to the rejection of the similar limitations of Claim 10.

Regarding **Claim 14**, each of the amplifiers (12,13) in the system of Aoki inputs the signal applied from the the reception terminal (23) through a pair of transistors (15,16) (col. 4, lines 59-66; col. 5, lines 1-9). These connections for the other amplifier (13) reads on "the second amplifier at least indirectly amplifies the input signal to generate the second output signal".

Regarding **Claim 15**, Aoki discloses the use of a preamplifier (11) that, through the use of a DC offset input signal (V_{OS}) and a selected combination of component values, provides an alteration of the potentials applied through the emitters of the transistors (Ve15,Ve16), which alters the signal levels applied through the amplifiers (12,13) to the output terminals (28,29) (col. 8, lines 19-55). This preamplifier (11), which changes the center potential of the processed signal, maintaining it near half of the power source voltage, reads on "a volume control circuit adapted to adjust a signal level of the input signal applied to the first and second amplifier". As noted above, GrosJean teaches a switching means (7) that involves a movable contact arm (19) and is used in the presence of a positive or negative potential to disconnect the power source from the power

amplifiers (9,11) (col. 3, lines 13-16). The disconnected state of the switches (19) is maintained by a latch means, the duration of which is determined by the properties of the involved resistances and capacitances (col. 3, lines 23-35). This maintaining of a switch state according to the values of the latch circuit reads on detecting "a muting control circuit adapted to mute the input signal supplied to the first and second amplifiers for a predetermined length of time".

6. **Claims 18-21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki as applied above to Claim 9, and in further view of Trump.

As detailed above, Aoki discloses balanced transformerless (BTL) circuit that maintains the DC offset voltage at an acceptable, predetermined level.

The system of Aoki does not specify:

- at least one activation/deactivation circuit adapted to activate or deactivate at least one of the first and second amplifiers responsive to the determination of whether or not the DC offset is larger than the prescribed voltage

Trump discloses a loudspeaker protection circuit for sensing a DC signal at an unacceptable voltage being applied to a loudspeaker. The presence of a DC signal of undesirable levels is determined based on the successive lengths of time that a signal exceeds a given voltage

range (col. 3, lines 4-20). The detection of a signal that exceeds the given voltage is compared with the length of time that the signal previously exceeded the given voltage range (col. 2, lines 35-49). Non-matching excursions beyond the range indicate the presence of a potentially damaging condition, beyond an given range (col. 2, lines 58-62). The detection of a damaging condition or undesirable amount of DC current triggers a switch connected in series between the amplifier output and the loudspeaker to be disconnected (col. 3, lines 20-24). Trump also discloses the option of disabling (260) the amplifier it an audio circuit in the presence of a detected undesirable signal (col. 3, lines 34-45). This option, in view of the pair amplifiers in a BTL arrangement reads on "at least one activation/deactivation circuit adapted to activate or deactivate at least one of the first and second amplifiers responsive to the determination of whether or not the DC offset is larger than the prescribed voltage".

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to utilize the power supply deactivation means to prevent the application of the output signal to a load in the system of Aoki. The motivation behind such a modification would have been that such an arrangement would have immediately removed the potentially damaging voltage from the speaker input. The system of Aoki responds by providing feedback, which as the DC offset increases or a large offset quickly appears, provides a larger feedback signal as compensation, whereas the system of Trump

would have completely removed the excessive voltage from the speaker inputs while the offset returns to acceptable levels.

Regarding **Claim 19**, in the system of Trump, the detection of a damaging condition or undesirable amount of DC current triggers a switch (250) connected in series between the amplifier output and the loudspeaker to be disconnected (col. 3, lines 20-24). This switch, in the context of a balanced transformerless arrangement that applies two audio signals to a speaker, reads on "a switch between at least one of the first and second amplifiers and a speaker, wherein the switch is adapted to prevent at least one of the first and second output signals from being supplied to the speaker responsive to the determination of whether or not the DC offset is larger than the prescribed voltage".

Regarding **Claim 20**, Trump teaches that the use of a delay of sufficient length will provide audible indication as to the undesirable signal situation (col. 3, lines 30-33). The inclusion and use of such a delay means reads on "a warning circuit adapted top activate a warning device responsive to the determination of whether or not the DC offset is larger than the prescribed voltage".

Regarding **Claim 21**, please refer to the above rejections of the similar limitations of Claims 15 and 18.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Graham

whose telephone number is 703-308-6729. The examiner can normally be reached on Monday-Friday, 8:30 AM to 5:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AG

Andrew Graham

Examiner
A.U. 2644

ag
October 18, 2004

XU MEI
PRIMARY EXAMINER